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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/512,119	10/21/2004	Matthias Wendt	DE 020103	2393

24738 7590 04/26/2007

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EXAMINER	
ROSENAU, DEREK JOHN	
ART UNIT	**PAPER NUMBER**
2834	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/512,119	WENDT ET AL.	
	Examiner	Art Unit	
	Derek J. Rosenau	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakurai (US 4965532) in view of Sakurai et al. (US 6569109).

3. With respect to claim 10, Sakurai discloses a starting-process controller for starting a piezomotor (Fig 3), comprising: a voltage-controlled oscillator (item 117), a power output stage (item 13), a resonance converter (column 9, lines 39-46), a phase comparator (item 15), a phase-locked loop filter (item 16), and an adjustable time-delay element (item 12), wherein the VCO generates the control signals required for the power output stage (Fig 3), the power output stage provides stepped output voltage (column 9, lines 39-46), the resonance converter converts the stepped output voltage from the power output stage into a motor voltage for driving the piezomotor (column 9, lines 39-46), the motor voltage being sinusoidal and having an associated motor current when the piezomotor is driven (column 9, lines 39-46), the phase-locked loop filter is configured to smooth the phase-difference signal so as to provide a smoothed signal that controls the VCO (column 13, lines 5-12), and the adjustable time-delay element providing for controlled reduction of the phase difference between the motor voltage and a reference in a start-up process for starting up the piezomotor from an initially large

starting angle at initiation of the start-up process towards a smaller operating angle at an operating point, the adjustable time-delay element effecting reduction in the form of one of: (i) a preset linear gradient, the linear gradient having a preset starting delay, a preset final delay, and a preset, fixed change in delay per selected time increment over the duration of the start-up process, such that, at initiation of the start-up process, the starting delay applies to generate a start-up phase angle toward enabling reliable start-up of the piezomotor and, at the operating point, the final delay applies to generate an operating phase angle toward enabling reliable operation of the piezomotor (column 7, line 48 through column 8, line 16), or (ii) ..., or (iii) a preset combination of a linear gradient and a progressive curve.

Sakurai does not disclose expressly that the phase comparator compares the motor current with the phase of the motor voltage, and provides a phase-difference signal representing a measure of the phase difference between motor current and the motor voltage.

Sakurai et al. teaches a controller for a piezoelectric device in which a phase comparator compares the motor current with the phase of the motor voltage, and provides a phase-difference signal representing a measure of the phase difference between motor current and the motor voltage (column 12, lines 50-55).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the voltage-current phase comparator of Sakurai et al. with the starting-process controller of Sakurai for the benefit of eliminating the need for the reference signal, thus reducing the number of components required.

4. With respect to claim 11, the combination of Sakurai and Sakurai et al. discloses the starting-process controller as claimed in claim 10. Sakurai discloses that the reduction in phase angle during the start-up process is in the form of a ramp (column 7, lines 56-62 and Figures 8A-8D). The reference frequency, which is phase locked with the voltage, is varied monotonously, which results in the phase angle being varied in the form of a ramp.

5. With respect to claim 12, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 10. Sakurai et al. discloses that the adjustable-time delay element comprises a digital counter (item 123), and wherein the digital counter effects the controlled reduction in phase angle between the motor voltage and the motor current in the form of the linear gradient, the progressive curve, or the combination of such gradient and curve (column 12, line 50 through column 13, line 23).

6. With respect to claim 13, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 12. Sakurai et al. discloses that, at selected times during the start-up process, the digital counter has respective starting values such that the starting value of the digital counter at a particular selected time fixes the respective delay as to the motor current, the delay generating a phase angle at such selected time (column 12, line 50 through column 13, line 23).

7. With respect to claim 14, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 13. Sakurai et al. discloses that the digital counter counts from each starting value to a preset final count, the final count being

associated with the passing on of the motor current subject to the respective delay (column 12, line 50 through column 13, line 23).

8. With respect to claim 15, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 13. Sakurai et al. discloses a start-up process delay controller (item 125), the start-up process delay controller controlling the adjustable time-delay element by one or both of (i) providing the starting values to the digital counter of the adjustable time-delay element (column 13, lines 7-9) and/or (ii) having a timing interval associated with the selected time increment between changes in delay.

9. With respect to claim 16, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 10. Sakurai et al. discloses a start-up process delay controller (item 125), the start-up process delay controller controlling the adjustable time-delay element by one or both of (i) providing one or more of the starting delay, the final delay and/or the change in delay (column 13, lines 7-14).

10. With respect to claim 17, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 16. Sakurai et al. discloses that the start-up process delay controller comprises a reference counter that counts oscillations of a reference frequency, the reference frequency forming a clock signal of the reference counter (column 12, line 50 through column 13, line 23).

11. With respect to claim 18, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 17. Sakurai et al. discloses that the counts made

by the reference counter are used directly for setting the delay (column 12, line 50 through column 13, line 23).

12. With respect to claim 19, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 17. Sakurai et al. discloses that the counts made by the reference counter are converted into a value for setting the delay (column 12, line 50 through column 13, line 23).

13. With respect to claim 20, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 17. Sakurai et al. discloses that the counts made by the reference counter are converted into settings for the delay by means of a table of a memory device (item 125 and column 12, line 50 through column 13, line 23).

14. With respect to claim 21, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 10. Sakurai et al. discloses that the starting process is monitored by a programmable control device (item 125).

15. With respect to claim 22, the combination of Sakurai and Sakurai et al. discloses the starting-process controller of claim 21. Sakurai et al. discloses that the programmable control device monitors the phase delay digitally (CPU 125 is a digital computer).

Response to Arguments

16. Applicant's arguments filed 3/19/2007 have been fully considered but they are not persuasive. Applicant argues that Sakurai does not disclose reducing the phase difference using a preset linear gradient, a preset progressive curve, or a preset combination of the two. However, as can be seen from column 7, line 48 through

column 8, line 16 and Figures 8A-8D, Sakurai discloses reducing the phase difference using a preset linear gradient, a preset progressive curve, or a preset combination of the two. In particular, Sakurai begins driving at a frequency corresponding to a reference signal θ_f, and that the phase difference between this and the voltage signal in order to control the frequency. The reference frequency is then changed monotonously (along a linear gradient) until resonance is reached, at which point the phase difference between current and voltage is used to maintain resonance. Applicant argues that there is not a sufficient showing of support of "the benefit eliminating the need for an additional reference signal." However, it has been held that the elimination of a component and its function is obvious if the remaining device performs the same function (*In re Karlson*, 136 USPQ 184). Sakurai et al. shows that the same function can be performed by eliminating the reference signal and its generator by using only the phase difference between the voltage and current to adjust the frequency to achieve and maintain resonance. The elimination of the reference signal and its generator would provide the benefit of reducing the number of components necessary for the device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is 571-272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau
Examiner
Art Unit 2834

DJR
4/18/2007

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